REMARKS

This amendment is in response to the Official Action dated September 11, 2007. Claims 1, 10, 13, and 19 have been amended; as such claims 1, 3-13 and 15-22 are now pending in this application. Claims 1, 10, 13, and 19 are independent claims. Reconsideration and allowance is requested in view of the claim amendments and the following remarks.

An Example Embodiment

An example embodiment of the present invention is directed to a display device, containing organic EL elements, that compensates for the deterioration of the EL elements, and thereby the displayed image quality, over time. As current flows through the organic EL elements, the organic EL elements deteriorate due to heat and the general decline in the organic materials. The example embodiment includes an adjustment information retrieval means 4 for obtaining information regarding the necessary lighting adjustments, which are provided to the level adjustment circuit 2B. The adjustment information retrieval means 4 receives input, for example, through an operation from an outside source that measures color balance fluctuations. The output level adjustments reduce the visible effects of the deterioration of the EL elements. The necessary color balance adjustments may be determined by directly measuring the amount of characteristic deterioration of the EL elements. The level adjustment circuit 2B provides an adjustable reference voltage to the digital analog converter 21 which converts the input digital signal to an analog signal, which is augmented based on the reference voltage from the level adjustment circuit.

Rejections under 35 U.S.C. § 102

Claims 1, 3-7, 13, 15, and 16 have been rejected under 35 U.S.C. § 102 over U.S. Patent No. 6,765,551 to Nakano et al. ("Nakano"); claims 1, 3, 7, 13, and 16 are also rejected under 35 U.S.C. § 102 over U.S. Patent No. 6,563,479 to Weindorf et al. ("Weindorf"); claims 1, 3, 7-9, in 13, and 16-18 are also rejected under 35 U.S.C. § 102 over US Patent Pub. 2003/01607432 to Yasuda ("Yasuda").

Claim 1 recites: *an image display device, comprising:*

a circuit for generating drive signals from an input image signal ;

a plurality of pixels including a light emitting element for emitting light of a predetermined color of red , green or blue by being applied with said drive signal supplied for each color from said circuit ;

an adjustment information retrieve means for obtaining information relating to light emission adjustment proportional to the deterioration of said light emitting element;

a level adjustment circuit provided in said circuit , for changing a level of an RGB signal before dividing said drive signals to respective RGB colors based on said information obtained by said adjustment information retrieve means; and wherein

said level adjustment circuit changes a level of a direct current voltage supplied to said circuit, proportionally to account for the deterioration of a luminance of said light emitting element.

A. Nakano

Nakano discloses a column electrode driving circuit including a reference voltage generations circuit that adjusts the chromaticity of the display as the display changes between 64 grayscale levels of luminance. Nakano recognizes that as the chromaticity of the display screen changes, different colors come to dominate the display. For example, as the chromaticity gets darker, blue colors begin to dominate. This phenomenon is a characteristic of LCD devices; for each luminance level a certain color may be more pronounced. By providing a different reference voltage for each of the different colored pixels at each level of grayscale it is possible to correct for this and thereby ensure that each of the RGB values is uniformly pronounced in every grayscale/ambience level.

First, Nakano does not teach or suggest "*an adjustment information retrieve means for obtaining information relating to light emission adjustment proportional to the deterioration of said light emitting element.*" Nakano does not address issues pertaining to the deterioration of organic luminance devices. Nakano does not monitor or respond to the effects on the RGB values resulting from the deterioration of EL elements. Furthermore, since Nakano does not address EL element deterioration, Nakano does not include a mechanism for monitoring the deterioration of the EL elements.

Second, Nakano does not teach or suggest "*a level adjustment circuit provided in said circuit, for changing a level of an RGB signal before dividing said drive signals to respective RGB*

colors based on said information obtained by said adjustment information retrieve means." Fig. 3 of Nakano features an expanded diagram of source driver 1. Particularly evident, is the fact that the data passing through is divided into respective RGB lines beginning from Shift register 2. The D/A converter 6 receives and adjusts the RGB lines *after* the RGB lines have been divided into their respective drive signals. This differs from claim 1, which recites, "*changing a level of an RGB signal before dividing said drive signals to respective RGB colors."*

Third, Nakano does not teach or suggest "*said level adjustment circuit changes a level of a direct current voltage supplied to said circuit, proportionally to account for the deterioration of a luminance of said light emitting element."* Nakano's device provides 64 RGB reference voltage lines (64x3 lines), with each line providing a constant voltage corresponding to grayscale level. Reference voltage generation circuit 70 does not change the level of direct current voltage supplied, but instead provides a plurality of voltage values. Nakano does not seek to adjust the voltage relative to the deterioration of the EL device. Instead, Nakano simply uses as an initial measurement of the RGB values at various grayscale levels, and presets the various voltage values coming from the reference voltage generations circuit 70 to the DA converter 50 and never changes them relative to any other value. There is no measurement or any other form of inputs to the reference voltage generations circuit that changes these values.

B. Weindorf

Weindorf discloses a resolution control system for a display device including a display and control circuitry. The device includes light sensor 114 and user interface 112, which provide input data to control circuit 1. The control circuit includes digital to analog circuitry 310. The DAC circuitry 310 includes a first DAC 312 and a second DAC 314. The DAC circuit 310 accepts input digital signal and produces a voltage output. While Weindorf includes a light sensor 114, the light sensor 114 is an ambient light sensor, which determines the light in the environment of the digital display device, and not light from the display device. Using the ambient light sensor 114, Weindorf adjusts their luminescence of the display device, however, this is does not appear to be anything other than raising the luminance of the display uniformly.

Like Nakano, Weindorf does not relate to the problem of deteriorating EL elements in a display and therefore does not provide a mechanism to address this problem. As such, Weindorf does not teach or suggest "*an adjustment information retrieve means for obtaining information relating to light emission adjustment proportional to the deterioration of said light emitting element*" or that "*said level adjustment circuit changes a level of a direct current voltage supplied to said circuit, proportionally to account for the deterioration of a luminance of said light emitting element.*"

C. Yasuda

Yasuda is the only reference that directly addresses the degradation in luminance characteristics of organic EL materials over time. Yasuda recognizes that, even if the color balance is adjusted in the initial state, the color balance deviates with the passage of time. Yasuda discloses an active color electroluminescent display device including a plurality of EL elements, each EL element having a red light emitting layer, a green light emitting layer, and the blue light emitting layer. The device also includes a red gamma correction circuit 101, a green gamma correction circuit 102, and a blue gamma correction circuit 103 corresponding to the light emitting layers (See Fig 3). Each gamma correction circuit 101-103 receives its own red, green, or blue video signal. Each gamma correction circuit 101-103 includes a DAC 110. These DACs 110, included in the gamma correction circuits 101-103, are illustrated in Fig. 5 of Yasuda. The use of multiple gamma correction circuits make it evident that the level adjustment circuit operates on the RGB signal *after* the RGB signal has been divided into its respective red, green, and blue layers. (See paragraph 33).

Yasuda fails to teach or suggest "*a level adjustment circuit provided in said circuit for changing a level of an RGB signal before dividing said drive signals to respective RGB colors based on said information obtained by said adjustment information retrieve means.*" Yasuda discloses adjusting the gamma levels in a series of RGB signals after the signals have been divided into the respective colors. That is the reason that Yasuda employs three gamma correction circuits 101-103, one for each color. This is the very problem disclosed in the background section of the present application (paragraph 12) and addressed in the detailed description (paragraph 23). By

comparison, in the present application the signal is divided into the respective RGB values, after being adjusted in the DAC.

> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."
> *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).
>
> The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required.
> *In re Bond*, 910 F.2d 831 (Fed. Cir. 1990).
>
> "When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art."
> *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001)
>
> "The identical invention must be shown in as complete detail as is contained in the ... claim."
> *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989).

Accordingly, given the arguments set forth above, neither Nakano, Weindorf, nor Yasuda teach or suggest the features of claim 1. For similar reasons, claim 13 is also neither taught nor suggested by the above references.

Therefore, withdrawal of the rejections under 35 U.S.C. § 103 is respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 9 and 18 are rejected under 35 U.S.C. § 103 over Nakano. Claims 8 and 17 are rejected under 35 U.S.C. § 103 over Nakano in view of U.S. Patent No. 6,774,578 to Tanada et al. ("Tanada").

As set forth above, Nakano fails to teach or suggest "*an adjustment information retrieve means for obtaining information relating to light emission adjustment proportional to the deterioration of said light emitting element*" or that "*said level adjustment circuit changes a level of*

a direct current voltage supplied to said circuit, proportionally to account for the deterioration of a luminance of said light emitting element."

Tanada discloses a device for detecting and accounting for EL degradation by detecting the variance in luminance on a pixel-by-pixel basis. However, Tanada does not disclose or suggest a level adjustment circuit that changes a level of a direct current voltage supplied to said circuit that is proportional to the luminance of a light emitting element, all features that are also absent from Yamazaki, as described above.

Even assuming, arguendo, that Nakano and Tanada were combinable, Applicant submits that none of the cited references either alone or in any proper combination, cure the deficiencies of Nakano with respect to at least the previously identified features of claims 1 and 13.

Accordingly, Applicant respectfully requests that the rejection of claims 8, 9, 17 and 18 under 35 U.S.C. § 103(a) be withdrawn.

Claims 9 and 18 are rejected under 35 U.S.C. § 103 over Weindorf. Claims 8 and 17 are rejected under 35 U.S.C. § 103 over Weindorf in view of Tanada.

As set forth above, Weindorf fails to teach or suggest "*an adjustment information retrieve means for obtaining information relating to light emission adjustment proportional to the deterioration of said light emitting element,*" and that "*said level adjustment circuit changes a level of a direct current voltage supplied to said circuit, proportionally to account for the deterioration of a luminance of said light emitting element.*" This is because Weindorf does not relate to the problem of deteriorating EL elements. As such Weindorf does not monitor the deterioration of the EL elements nor include any mechanism to predict deterioration.

Tanada does not disclose or suggest a level adjustment circuit that changes a level of a direct current voltage supplied to said circuit that is proportional to the luminance of a light emitting element, all features that are also absent from Weindorf, as described above.

Even assuming, arguendo, that Weindorf and Tanada were combinable, Applicant submits that none of the cited references either alone or in any proper combination, cure the deficiencies of Nakano with respect to at least the previously identified features of claims 1 and 13.

Accordingly, Applicant respectfully requests that the rejection of claims 8, 9, 17 and 18 under 35 U.S.C. § 103(a) be withdrawn.

Claims 10-12 and 19-22 are rejected under 35 U.S.C. § 103 over Nakano is view of U.S. Patent No. 6,982,686 to Miyachi et al. ("Miyachi").

Claims 10 recites: *[a]n image display device, comprising:*
a circuit for generating drive signals from an input image signal ; and
a plurality of pixels including a light emitting element for emitting light of a predetermined color of red , green or blue by being applied with said drive signal supplied for each color from said circuit;
wherein said circuit comprises
a motion detection circuit for detecting motions by said image signal;
a level adjustment circuit for changing a level of an RGB signal before divided to said drive signals for the respective RGB colors based on a result of the motion detection obtained from said motion detection circuit; and
a duty ratio adjustment circuit for changing the duty ratio of a light emission time of said pixels based on the motion detection result.

Miyachi discloses a method and apparatus for managing the light intensity of cold-cathode tubes in LCD monitors. Particularly, the cited elements of Miyachi are directed to a system for managing the illumination produced by cold-cathode tubes based on the motion present in a video signal. In Fig. 42, a video signal is input to liquid crystal panel control circuit 804. Control circuit 804 produces three output signals, two output signals for controlling the liquid crystal panel 805, and one output signal for controlling inverter control circuit 801. Inverter control circuit 801 controls cold-cathode tube 803, via Inverter 802. No signal is passed to the liquid display panel 805 for controlling the cold-cathode tube. Instead, an external circuit, i.e. inverter circuit 801, dims the cold-cathode tube.

The Office Action admits that Nakano does not teach or suggest "*wherein said circuit comprises a motion detection circuit for detecting motions by said image signal; a level adjustment circuit for changing a level of an RGB signal before divided to said drive signals for the respective RGB colors based on a result of the motion detection obtained from said motion detection circuit; and a duty ratio adjustment circuit for changing the duty ratio of a light emission time of said pixels based on the motion detection result.*" The Office Action relies on Miyachi for these teachings.

Applicant submits that Miyachi does not teach, suggest, or render obvious "*a level adjustment circuit for changing a level of an RGB signal before divided to said drive signals for the respective RGB colors based on a result of the motion detection obtained from said motion detection circuit; and a duty ratio adjustment circuit for changing the duty ratio of a light emission time of said pixels based on the motion detection result,*" as recited in independent claim 10.

First, Miyachi does not address EL elements. Miyachi is directed to LCD devices that employ backlighting to attain luminescence. Miyachi is not directed to LED devices using EL elements. As such the mechanisms discloses in Miyachi are not directly compatible with the teachings of Nakano. Very simply, LED devices operate differently than cathode-tube based LCD devices.

Second, Miyachi does not solve the problems associated with motion on an EL display device by modifying "*a level of an RGB signal,*" nor does Miyachi teach "*changing the duty ratio of a light emission time of said pixels*". Instead, Miyachi adjusts the luminance by directly dimming a cold-cathode tube. Miyachi therefore changes the light emission of the cold-cathode tube, whereas applicant is claiming "*changing the duty ratio of a light emission time of said pixels,*" as exemplified in Applicant's Figs. 8 and 9.

Even if Nakano and Miyachi were combinable (which applicant does not admit), the combination still fails to render independent claim 10 obvious. Instead, a combination of Nakano and Miyachi would produce a system capable of modifying a digital signal to compensate for backlight deterioration (not organic EL element deterioration) and which modulates the backlight to

improve video and still image clarity. The combination fails to yield "*a level adjustment circuit for changing a level of an RGB signal... based on a result of the motion detection obtained from said motion detection circuit; and a duty ratio adjustment circuit for changing the duty ratio of a light emission time of said pixels based on the motion detection result.*"

Therefore, Applicant submits that none of the cited references of Nakano and Miyachi, either alone or in any proper combination, cure the deficiencies of Nakano with respect to at least the previously identified features of claim 10. For similar reasons, independent claim 19 is neither disclosed, suggested, nor rendered obvious by Nakano and Miyachi (although claims 10 and 19 should be interpreted solely based upon the limitations set forth therein).

Furthermore, Applicant notes that claims 11 and 20 are also neither taught nor rendered obvious by Nakano and Miyachi for similar reasons to those set forth regarding claim 1 (above).

CONCLUSION

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-0013, under Order No. SON-2839 from which the undersigned is authorized to draw.

Dated: February 22, 2008

Respectfully submitted,

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